

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
1 April 2004 (01.04.2004)

PCT

(10) International Publication Number  
**WO 2004/026618 A1**

(51) International Patent Classification<sup>7</sup>: **B60N 2/06, 2/36**

(74) Agents: **MACKENZIE, Kevin, S. et al.**; Clark Hill PLC,  
500 Woodward Avenue, Suite 3500, Detroit, MI 48226-  
3435 (US).

(21) International Application Number:  
PCT/US2003/029457

(22) International Filing Date:  
22 September 2003 (22.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/412,293 20 September 2002 (20.09.2002) US

(71) Applicant (for all designated States except US): **INTIER  
AUTOMOTIVE, INC.** [US/US]; 600 Wilshire Drive,  
Troy, MI 48084 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **TAME, Omar, D.**  
[US/US]; 4059 Green Lake Road, West Bloomfield, MI  
48324 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,  
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

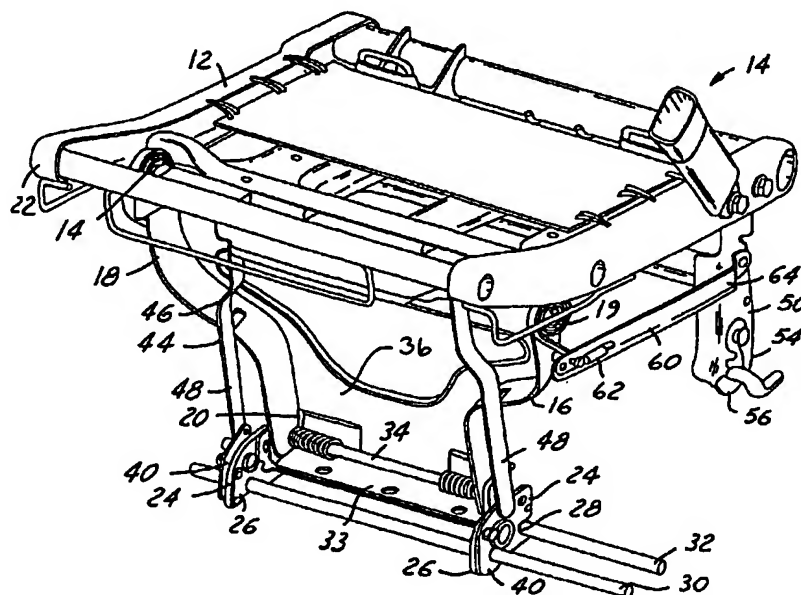
(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: **STOW IN FLOOR SEAT ASSEMBLY WITH MAIN LATERAL DISPLACEMENT**



(57) Abstract: The seat assembly includes a seat cushion. A front leg is pivotally coupled to the seat cushion for movement of the seat cushion between a seating position and a forwardly dumped position. A support bracket is pivotally attached to the front legs at lower portions of the front legs. A track assembly is attached to the support bracket. The track assembly is secured in a lateral orientation to a floor of a vehicle with respect to the seat assembly; whereby the seat assembly may be moved to a plurality of positions within the vehicle.

WO 2004/026618 A1



---

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## **STOW IN FLOOR SEAT ASSEMBLY WITH MAIN LATERAL DISPLACEMENT**

### **BACKGROUND OF THE INVENTION**

#### **1. Field of the Invention**

[0001] The invention relates to a seat assembly for an automotive vehicle, and more particularly, to a riser assembly for manually displacing the seat cushion laterally within the vehicle.

#### **2. Description of the Related Art**

[0002] Automotive vehicles include seat assemblies for supporting occupants within the vehicle. Seat assemblies include a seat cushion and a seat back operatively coupled to the seat cushion by a recliner mechanism for allowing selective pivotal adjustment of the seat back relative to the seat cushion between a plurality of reclined seating positions. Typically, the seat back is also movable between any one of the reclined seating positions and a generally horizontal, forwardly stowed position to present a load floor surface on the back of the seat back.

[0003] It is known in the automotive seating art to mount a riser assembly between the seat cushion and the floor of the vehicle for moving the seat assembly between a seating position with the seat cushion spaced above the floor of the vehicle and a forwardly stowed position with the seat cushion disposed generally forward of the seating position and lying against the floor of the vehicle. It is also known for such a riser assembly to allow movement of the seat assembly between the seating position and a stowed position within a recess in the floor of the vehicle. However, it remains desirable to have a riser assembly that allows movement of the seat assembly between the seating position and a stowed position within a recess substantially laterally offset from the seating position.

### **SUMMARY OF THE INVENTION**

[0004] According to one aspect of the invention, a seat assembly is provided for supporting an occupant above a floor of an automotive vehicle. The seat assembly includes a seat cushion. A front leg is pivotally coupled to the seat cushion for movement of the seat cushion between a seating position and a forwardly dumped position. A support bracket is

pivotally attached to the front legs at lower portions of the front legs. A track assembly is attached to the support bracket. The track assembly is secured in a lateral orientation to a floor of a vehicle with respect to the seat assembly; whereby the seat assembly may be moved to a plurality of positions within the vehicle.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[0005] Advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

[0006] Figure 1 is a side view of a seat assembly incorporating a riser assembly according to one aspect of the invention;

[0007] Figure 2 is a perspective view of the seat assembly;

[0008] Figure 3 is an enlarged partial view of the seat assembly; and

[0009] Figure 4 is a perspective view of the seat assembly according to an alternative embodiment of the invention.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

[0010] Referring to the figures, a seat assembly for supporting an occupant above a floor of an automotive vehicle is generally indicated at 10 in Figure 1. The seat assembly 10 includes a seat cushion 12 and a seat back (not shown) pivotally coupled to the seat cushion 12 for movement between a generally upright seating position and a forwardly folded flat position overlying the seat cushion 12. A riser assembly 14 releasably interconnects the seat assembly 10 to the floor of the vehicle. Described in greater detail below, the riser assembly 14 allows movement of the seat cushion 12 between a seating position A and a forwardly dumped position B with the seat cushion 12 extending generally longitudinally upright from the riser assembly 14. The riser assembly 14 also allows movement of the seat cushion 12 between the forwardly dumped position B and a forwardly stowed position C lying generally flat upon the floor of the vehicle. The riser assembly 14 further allows the seat assembly 10 to be selectively laterally displaced along the floor of the vehicle.

Referring to Figures 2 and 3, the riser assembly 14 includes generally parallel front legs 16 each extending between upper 18 and lower 20 ends. The upper end 18 is pivotally coupled at the location of the first assist spring 19, to a front end 22 of the seat cushion 12 for movement of the seat cushion 12 between the seating A and forwardly dumped B positions. A first assist spring 19 extends between the upper end 18 of each the front leg 16 and the seat cushion 12 for pivotally biasing the seat cushion 12 toward the forwardly dumped position B. The lower end 20 of each front leg 16 is pivotally coupled to a respective foot bracket 24 for movement of the front legs 16 between a support position for supporting the seat cushion 12 in the seating position A, as shown in the Figures 2 and 3, and a stowed position extending generally longitudinally along the floor of the vehicle. Each foot bracket 24 extends between front 26 and rear 28 hook portions. The front 26 and rear 28 hook portions are slidably engaged with generally parallel front 30 and rear 32 rods, respectively, for selective movement of said seat cushion 12 between a plurality of lateral positions within the vehicle. The front 30 and rear 32 rods are fixedly secured in a lateral orientation to the floor of the vehicle by any suitable means, such as welding or bolting. The front hook portion (26) comprises an arcuate member adapted to engage an upper portion of the front rod (30). The cinching hook (40) comprises an arcuate member adapted to engage a lower portion of the front rod (30). The front hook portion (26) and cinching hook (40) cooperate to securely engage the front rod (30). The rear hook portion (28) comprises a member having a u-shaped slot adapted to engage the rear rod (32) for sliding movement therein. Preferably, rubber or polymeric bumpers 27, 29 are fixedly secured to both the front 26 and rear 28 hook portions for minimizing vibration between the foot brackets 24 and the front 30 and rear 32 rods.

[0011] The floor brackets 24 are fixedly secured to opposite sides of a central bracket 33. A second assist spring 34 extends between the lower end 20 of each front leg 16 and the central bracket 33 for biasing the front legs 16 toward the stowed position. A cross member

36 extends laterally in the vehicle between the front legs 16 for stabilizing the movement of the front legs 16 between the support and stowed positions.

[0012] A cinching hook 40 is pivotally assembled by a pivot pin 143 to the foot bracket 24 adjacent the front hook 26 for movement between a locked and unlocked position. In the locked position, the cinching hook 40 cooperates with the front hook portion 26 to bindingly cinch the front rod 30 for resisting lateral displacement of the seat assembly 10 along the front 30 and rear 32 rods. In the unlocked position, the cinching hook 40 is substantially disengaged from the front rod 30 to allow manual lateral displacement of the seat assembly 10 along the front 30 and rear 32 rods. A biasing member 42 is coupled between the foot bracket 24 and the cinching hook 40 for biasing the cinching hook 40 toward the locked position.

[0013] A link 44 extends longitudinally between an upper end 46 pivotally coupled to the seat cushion 12 and a lower end 48 pivotally coupled to the cinching hook 40 for moving the cinching hook 40 between the locked and unlocked positions in response to movement of the seat cushion 12 between the seating A and forwardly dumped B positions.

[0014] The riser assembly 14 also includes generally parallel rear legs 50 extending between upper 52 and lower 54 portions. The upper portion 52 of the rear legs 50 are pivotally coupled to the seat cushion 12 for movement of the rear legs 50 between a support position, as shown in Figures 2 and 3, and a stowed position aligned longitudinally along the bottom of the seat cushion 12. The lower portion 54 includes a latch hook 56 for selectively locking the rear legs 50 to a pin fixedly secured to the floor of the vehicle, as known by those of ordinary skill in the art. A link 60 extends between a front end 62 pivotally coupled to one of the front legs 16 and a rear end 64 pivotally coupled to one of the rear legs 50 for automatically moving the rear legs 50 between the support and stowed positions in response to pivotal movement of the seat cushion 12 relative to the front legs 16 between the seating A and forwardly dumped B positions. The effective length of the link 60 shortens as the seat cushion 12 is moved to the forwardly dumped position thereby pulling and pivoting the rear legs 50 to the stowed position.

[0015] In use, the front 16 and rear 50 legs extend generally upright in the support position to support the seat cushion 12 in the seating position A. The location of the link 44 associated with the cinching hook in front of the pivot point of the seat cushion relative to the

front legs 16 pulls the link 44 to maintain the locked cinch hook 40 when in the seating position. The link 44 pulls the cinching hook 40 toward the locked position against the force applied by the biasing member 42. The front rod 30 is cinched between the cinching hook 40 and the front hook portion 26 preventing manual lateral movement of the seat assembly along the front 30 and rear 32 rods. The bumper 27 is compressed between the front hook portion 26 and the front rod 30 to minimize noise caused by vibration therebetween.

[0016] To move the seat cushion 12 between the seating A and forwardly dumped B positions, the latch hook 56 is released from the pin fixedly secured to the floor by suitable releasing means, such as a release lever, as commonly known by those skilled in the art. The seat cushion 12 is then freely pivotally movable between the seating A and forwardly dumped B positions. When the seat cushion 12 is moved to the forwardly dumped position B, the link 60 responsively pulls the rear legs 50 to the stowed position. Movement of the seat cushion 12 toward the forwardly dumped position B is assisted by the first assist spring 19. The link 44 is urged generally downwardly, as viewed in the figures, to move the cinching hook 40 to the unlocked position in response to the pivotal movement of the seat cushion 12 toward the forwardly dumped position B. Thus, while the seat cushion 12 is in the forwardly dumped position B, the seat cushion 12 is manually displaceable along the front 30 and rear 32 rods. Further, while the seat cushion 12 is in the forwardly dumped position B, the seat cushion 12 with the seat back in the flat position is movable to the forwardly stowed position C by pivotal movement of the front legs 16 from the support position to the stowed position. Movement toward the forwardly stowed position C is assisted by the second assist spring 34.

[0017] The seat cushion 12 may be returned to the forwardly dumped position B by rotating the front legs 16 toward the support position against the bias of the second assist spring 34. From the forwardly dumped position B, the seat cushion 12 may be pivotally moved to the seating position A against the bias of the first assist spring 19. While the seat cushion 12 is moved to the seating position A, the link 60 responsively urges the rear legs 50 to the support position from the stowed position. The link 44 is urged generally upwardly to move the cinching hook 40 toward the locked position to prevent lateral movement of the seat cushion 12 along the front 30 and rear 32 rods.

[0018] While the latch hook 56 is released from the pin fixedly secured to the floor, the seat cushion 12 may be manually laterally displaced along the front 30 and rear 32 rods by lifting the seat cushion 12 partially toward the forwardly dumped position enough to

relieve the cinching action upon the front rod 30 between the cinching hook 40 and the front hook portion 26. When a desired lateral position is found, the seat cushion 12 may be allowed to return to the seating position A. The latch hook 56 lockingly engages the pin fixedly secured to the floor to lock the seat cushion 12 in the seating position A.

[0019] An alternative embodiment of the riser assembly is generally indicated at 114 in Figure 4. The front legs 16 are pivotally coupled to a support bracket 133 for pivotal movement of the seat cushion 12 between the forwardly dumped position B and the forwardly stowed position C. The support bracket 133 is fixedly secured to a track assembly 130 fixedly secured in a lateral orientation to the floor of the vehicle.

[0020] More specifically, the track assembly 130 includes a lower track 132 fixedly secured to the floor of the vehicle and an upper track 134 slidably engaged to the lower track 132 for sliding movement between a plurality of lateral positions within the vehicle. A locking mechanism 150 is coupled between the lower 132 and upper 134 tracks for selectively locking the upper track 134 in any one of the plurality of lateral positions. The locking mechanism 150 is manually unlocked by a manual release mechanism 151, such as a bowden cable and lever, depicted by the dashed line of Figure 3.. Alternatively, the locking mechanism is coupled to the seat cushion 12 by a link 152 represented by the dashed line of Figure 3 linking the locking mechanism 150 and the seat cushion 12 at 153. Appropriate links 152 include a rod or a bowden cable, for selectively unlocking the locking mechanism 150 in response to movement of the seat cushion 12 between the seating A and forwardly dumped position B. The track assembly 130 and the locking mechanism 150 may be of any suitable type commonly known by those of ordinary skill in the art.

[0021] The invention has been described in an illustrative manner, and it is to be understood that the terminology, which has been used, is intended to be in the nature of words of description rather than of limitation.

[0022] Many modification and variations of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced other than as specifically described.



What is claimed is:

1. A seat assembly (10) comprising:  
  
a seat cushion (12);  
  
front legs (16) pivotally coupled to the seat cushion (12);  
  
a support bracket (133) pivotally attached to the front legs (16);  
  
a track assembly (130) attached to the support bracket (133), the track assembly (130) secured in a lateral orientation to a floor of a vehicle with respect to the seat assembly (10) whereby the seat assembly (10) may be moved to a plurality of positions within the vehicle.
2. The seat assembly (10) of claim 1 wherein the track assembly (130) comprises an upper track (134) attached to the support bracket (133) and a lower track (132) adapted to be attached to the floor of the vehicle, the upper track (134) received within the lower track (132) for sliding movement therein.
3. The seat assembly (10) of claim 2 wherein the track assembly (130) further includes a locking mechanism (150) associated with the upper and lower tracks (134, 132) for selectively locking the upper track (134) relative to the lower track (132).
4. The seat assembly (10) of claim 3 wherein the locking mechanism (150) comprises a manual release member (151).
5. The seat assembly (10) of claim 4 wherein the manual release member (151) is selected from the group consisting of a rod, and a Bowden cable attached to a handle.

6. The seat assembly (10) of claim 3 wherein the locking mechanism (150) is associated with the seat cushion (12), whereby movement of the seat cushion (12) between seating and forwardly dumped positions actuates the locking mechanism (150).

7. The seat assembly (10) of claim 6 wherein the locking mechanism (150) further includes a link (152) connecting the seat cushion (12) and locking mechanism (150) for actuating the locking mechanism (150).

8. The seat assembly (10) of claim 7 wherein the link (152) is selected from the group consisting of a rod, and a Bowden cable.

9. The seat assembly (10) of claim 1 further including rear legs (50) pivotally coupled to the seat cushion (12).

10. The seat assembly (10) of claim 9 wherein the rear legs include a lock hook for releasably connecting the rear legs (50) to the floor of a vehicle.

11. The seat assembly (10) of claim 9 further including a second link (60) connected to a front leg (16) at a first end (62) and a rear leg (50) at a second end (64) of the link (60) for pivoting the rear legs (50) between support and stowed positions in response to pivotal movement of the seat cushion between seating and forwardly dumped positions.

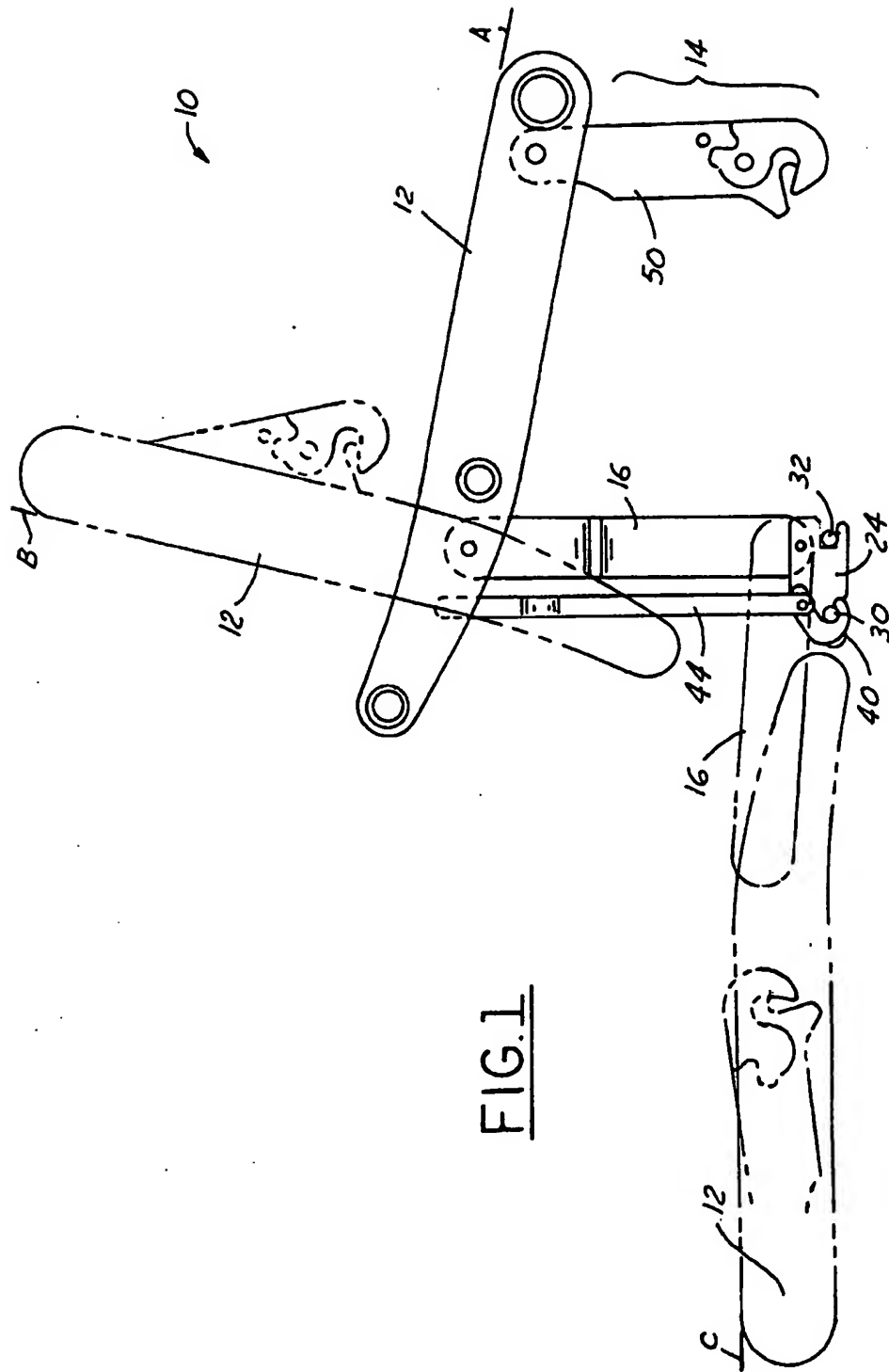
12. A seat assembly (10) comprising:

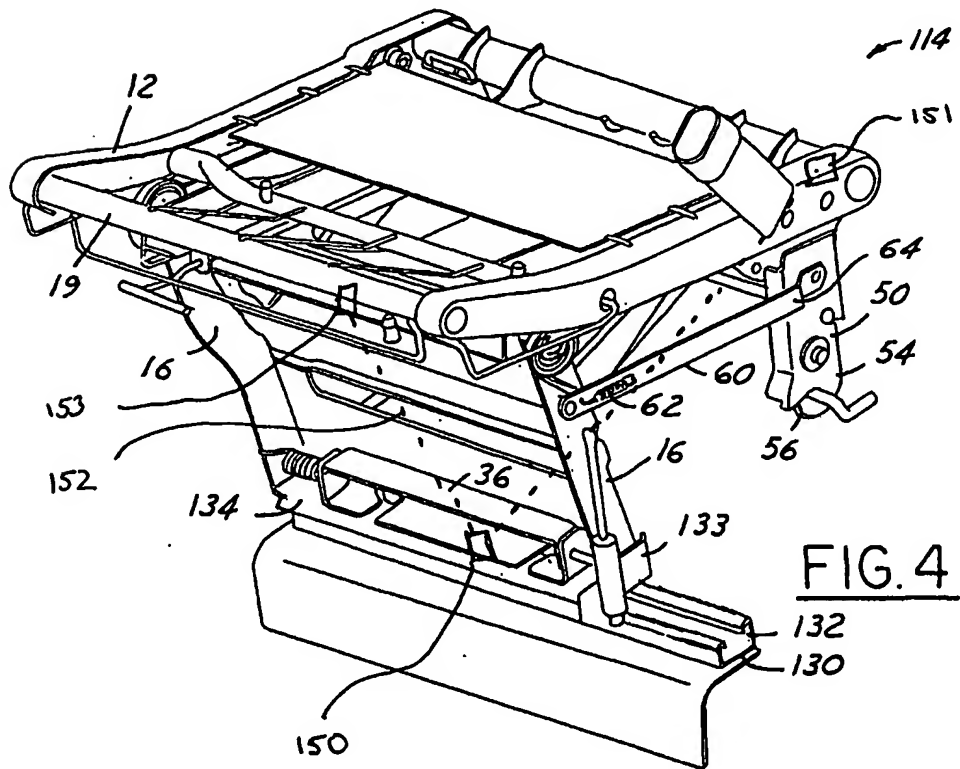
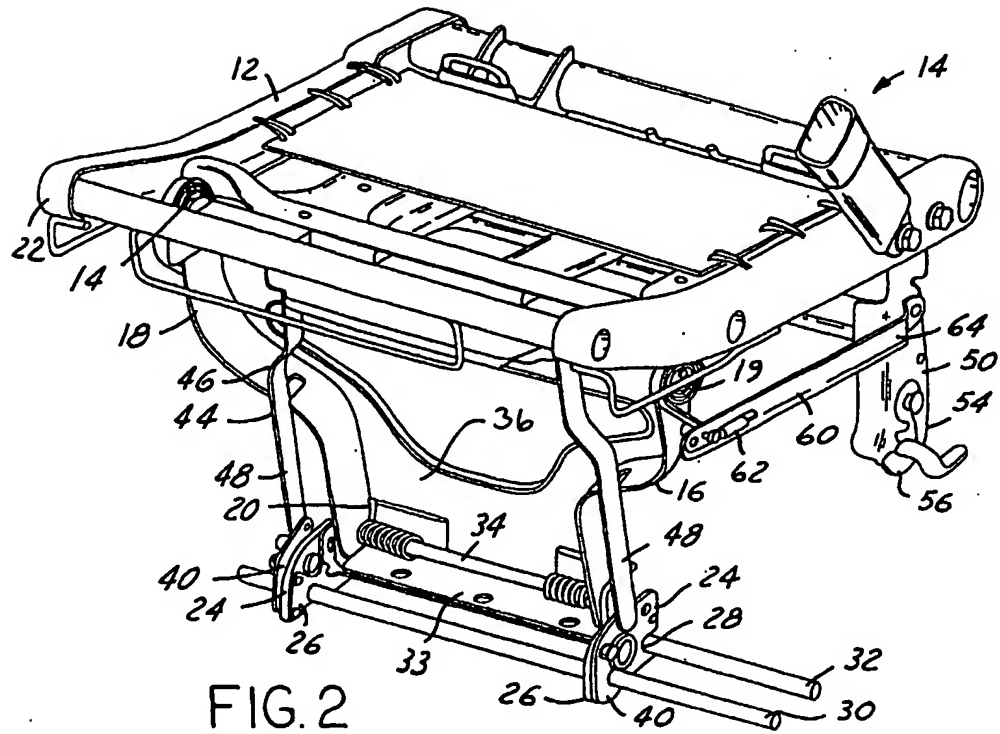
a seat cushion (12);

front legs (16) pivotally coupled to the seat cushion (12);

a support bracket (133) pivotally attached to the front legs (16);

a track assembly (130) attached to the support bracket (133), the track assembly (130) comprising an upper track (134) attached to the support bracket (133) and a lower track (132) attached to a vehicle floor in a lateral orientation with respect to the seat assembly (10), the upper track (134) received within the lower track (132) for sliding movement therein, whereby the seat assembly (10) may be moved to a plurality of positions within the vehicle.





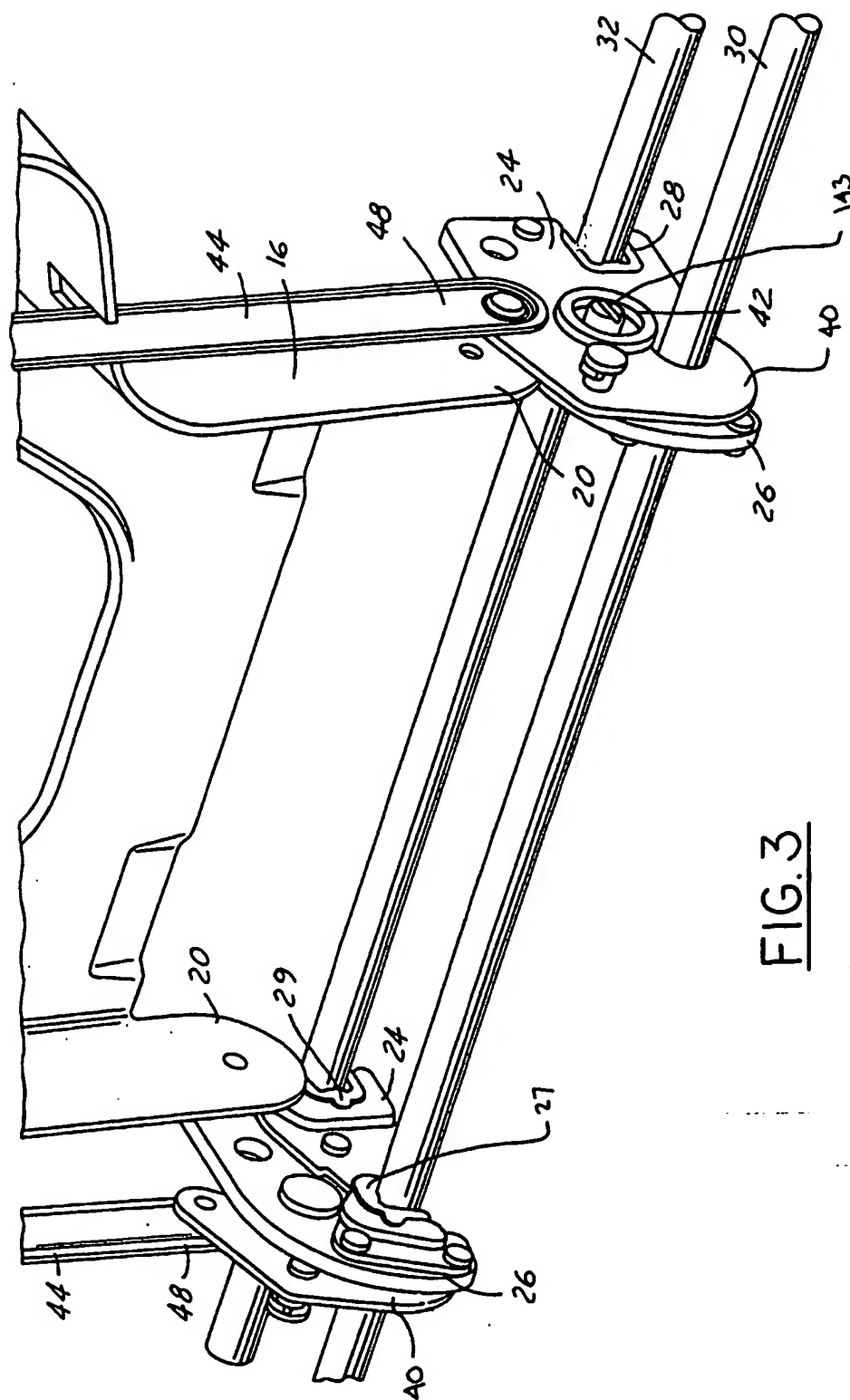


FIG. 3

# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 03/29457

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B60N2/06 B60N2/36

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B60N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 270 140 B1 (FIEROH LAWRENCE A ET AL) 7 August 2001 (2001-08-07)	1-3, 12
Y	abstract; figures 1-5	9, 10
Y	US 5 498 051 A (PATTOK MARK A ET AL) 12 March 1996 (1996-03-12)	9, 10
A	abstract; figures 1-4	1, 12
X	DE 100 58 906 A (BROSE FAHRZEUGTEILE) 6 June 2002 (2002-06-06)	1-5, 12
Y	abstract; figures 1-3	6-8
Y	US 5 158 338 A (HONMA MIKIO ET AL) 27 October 1992 (1992-10-27)	6-8
A	abstract; figures 1-4	1, 12
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- \*G\* document member of the same patent family

Date of the actual completion of the international search

12 December 2003

Date of mailing of the international search report

19/12/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan  
NL - 2280 HV Rijswijk  
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Gatti, C

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 03/29457

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 27 063 A (BROSE FAHRZEUGTEILE) 6 December 2001 (2001-12-06)	1-3,12
A	abstract; figures 1-6C ---	9
X	EP 0 970 844 A (JOHNSON CONTROLS GMBH) 12 January 2000 (2000-01-12)	1-3,12
A	abstract; figures 1-4 ---	9
X	EP 0 940 288 A (MAZDA MOTOR) 8 September 1999 (1999-09-08)	1-3,12
	abstract; figures 1-7 ---	
X	FR 2 811 620 A (RENAULT) 18 January 2002 (2002-01-18)	1-3,12
A	abstract; figures 1-4 ---	9
X	FR 2 645 810 A (PEUGEOT ;CITROEN SA (FR)) 19 October 1990 (1990-10-19)	1,2,12
A	abstract; figures 1-10 ---	9
A	FR 2 735 081 A (PEUGEOT) 13 December 1996 (1996-12-13)	1,12
	abstract; figures 1-4 ---	
A	US 4 949 931 A (IRIE HIDEKI ET AL) 21 August 1990 (1990-08-21)	6-8
	abstract; figures 2-7 ---	
A	DE 43 42 438 C (DAIMLER BENZ AG) 11 May 1995 (1995-05-11) -----	



# INTERNATIONAL SEARCH REPORT

nation on patent family members

International Application No

PCT/US 03/29457

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6270140	B1	07-08-2001	EP 0996554 A1	03-05-2000
			EP 1003404 A1	31-05-2000
			WO 9903702 A1	28-01-1999
			WO 9903703 A1	28-01-1999
			WO 9903377 A1	28-01-1999
			US 6378941 B1	30-04-2002
US 5498051	A	12-03-1996	NONE	
DE 10058906	A	06-06-2002	DE 10058906 A1	06-06-2002
US 5158338	A	27-10-1992	JP 1908606 C	24-02-1995
"			JP 3235725 A	21-10-1991
			JP 6039231 B	25-05-1994
DE 10027063	A	06-12-2001	DE 10027063 A1	06-12-2001
			WO 0189873 A1	29-11-2001
			EP 1289793 A1	12-03-2003
			EP 1329355 A1	23-07-2003
EP 0970844	A	12-01-2000	DE 29810333 U1	14-10-1999
			EP 0970844 A1	12-01-2000
EP 0940288	A	08-09-1999	JP 11245695 A	14-09-1999
			EP 0940288 A2	08-09-1999
			US 2002153740 A1	24-10-2002
			US 6129405 A	10-10-2000
			US 2002011737 A1	31-01-2002
FR 2811620	A	18-01-2002	FR 2811620 A1	18-01-2002
			DE 10133241 A1	23-05-2002
FR 2645810	A	19-10-1990	FR 2645810 A1	19-10-1990
FR 2735081	A	13-12-1996	FR 2735081 A1	13-12-1996
US 4949931	A	21-08-1990	JP 1921438 C	07-04-1995
			JP 2081738 A	22-03-1990
			JP 6045322 B	15-06-1994
DE 4342438	C	11-05-1995	DE 4342438 C1	11-05-1995
			GB 2284755 A , B	21-06-1995
			US 5593208 A	14-01-1997